

### 3.4.10 WASTE MANAGEMENT

This section outlines the major environmental regulatory structure and ongoing waste management activities for INEL. A more detailed discussion of the ongoing waste management operations is provided in Section E.2.3. Table 3.4.10–1 presents a summary of waste management activities at INEL for 1992.

The Department is working with Federal and State regulatory authorities to address compliance and cleanup obligations arising from its past operations at INEL. DOE is engaged in several activities to bring its operations into full regulatory compliance. These activities are set forth in negotiated agreements that contain schedules for achieving compliance with applicable requirements and financial penalties for nonachievement of agreed-upon milestones.

The EPA placed INEL on the NPL on December 21, 1989. DOE has entered into a Federal Facility Agreement and Consent Order with EPA and the State of Idaho to coordinate cleanup activities at INEL under a comprehensive strategy. This agreement integrates DOE's CERCLA response obligations with RCRA and *Hazardous Waste Management Act* of 1986 corrective action obligations. In this process, INEL has been divided into 10 waste area groups. Each group is subdivided into separate operable units composed of potential release sites that are considered together for assessment and cleanup activities. Ongoing assessments are characterizing the nature and extent of contamination. Aggressive plans are in place to achieve early remediation of sites that represent the greatest risk to workers and the public. The goal is to complete remediation of contaminated sites at INEL to support delisting from the NPL by 2019. INEL manages spent nuclear fuel and the following waste categories: high-level, TRU, low-level, mixed, hazardous, and nonhazardous. A discussion of the waste management operations associated with each of these categories follows.

**Spent Nuclear Fuel.** Spent nuclear fuel had been stored and processed at the ICPP. Processing was terminated with DOE's decision to halt reprocessing of spent nuclear fuel. INEL has received spent nuclear fuel from Three Mile Island, reactor tests, and the gas-cooled reactor and Naval Reactors Programs. Spent nuclear fuel from these programs and from reactor experiments at INEL is in storage in various locations. The bulk of the fuel is stored at the ICPP. Interim management of the spent nuclear fuel (pending the availability of a geologic repository) will be in accordance with the ROD published in the *Federal Register* on June 1, 1995 (60 FR 28680) and amended on March 8, 1996 (61 FR 9441), for the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS-0203-F). As a result of this ROD as amended, INEL will manage DOE's non-aluminum-clad spent fuel. This will require 114 shipments of aluminum-clad spent fuel to SRS and receipt of 1,133 shipments of non-aluminum-clad spent fuel. This spent fuel then will be placed in interim storage.

**High-Level Waste.** High-level waste at INEL was generated in the process of extracting useful isotopes from spent nuclear fuel at the ICPP. Most of this fuel was from the Naval Reactors Program. Most aqueous solutions from spent nuclear fuel processing and isotope extraction were concentrated by evaporation and separated into LLW and HLW streams in the Process Equipment Waste Evaporator. The liquid HLW is stored in subsurface tanks and then transformed into solid metallic oxides in a granular form by calcination. The calcine is stored in stainless steel bins in near-surface concrete vaults where it awaits further processing into a form suitable for emplacement in a Federal repository. As a result of the ROD for the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS-0203-F), calcination will resume until all liquid HLW is calcined. This will permit INEL to meet the requirements of a December 1991 consent order with the State of Idaho and EPA to cease use of existing storage tanks without constructing new tanks. Subsequently, the calcined waste will be treated to meet RCRA provisions on a schedule to be negotiated with the State of Idaho under the *Federal Facility Compliance Act*.

Table 3.4.10-1. Spent Nuclear Fuel and Waste Management Activities at Idaho National  
Engineering Laboratory

Category	1992 Generation (m <sup>3</sup> )	Treatment Method	Treatment Capacity (m <sup>3</sup> /yr)	Storage Method	Storage Capacity (m <sup>3</sup> )	Disposal Method	Disposal Capacity (m <sup>3</sup> )
Spent Nuclear Fuel	1.4 <sup>a,b</sup> heavy metal	Conditioning and stabilization	Under assessment <sup>c</sup>	Pools, dry facility	261 <sup>c,d</sup> heavy metal	None—High- Level Waste Program in the future	None
High-Level Liquid	560 <sup>b</sup>	Evaporation, calcination	470 <sup>e</sup>	Tank farm, after evaporation prior to calcination	13,400 <sup>f</sup>	NA	NA
Solid <sup>g</sup>	None <sup>b</sup>	Decontamination, filter leach	238 <sup>h</sup>	Bins inside concrete vaults	7,110 <sup>i</sup>	None—High- Level Waste Program in the future	None
Transuranic Liquid	None	NA	NA	NA	NA	NA	NA
Solid	1	Decontamination, filter leach, calcination	595 <sup>j</sup>	Asphalt pads and vaults in the ground or under earthen cover or tarps	206,000 <sup>k</sup>	None—WIPP or alternate facility in the future	None
Low-Level Liquid	None	Evaporation, Ion exchange	11,600 <sup>l</sup>	Tank farm after evaporation prior to calcination	With HLW	NA	NA
Solid	11,300	Incineration and compaction	3,350 <sup>m</sup>	NA	NA	Onsite burial	180,000 <sup>n</sup>
Mixed Liquid	5	Evaporation, fractionation, and calcination	11,600 <sup>l</sup>	Tank farm	With HLW	None	None
Solid	51	Incineration and compaction	3,350 <sup>m</sup>	Mixed waste storage facilities	115,000 <sup>o</sup>	None	None

**Table 3.4.10-1. Spent Nuclear Fuel and Waste Management Activities at Idaho National Engineering Laboratory—Continued**

Category	1992 Generation (m <sup>3</sup> )	Treatment Method	Treatment Capacity (m <sup>3</sup> /yr)	Storage Method	Storage Capacity (m <sup>3</sup> )	Disposal Method	Disposal Capacity (m <sup>3</sup> )
<b>Hazardous</b>							
Liquid	Included in solid	Offsite and percolation ponds	Under assessment <sup>c</sup>	Percolation ponds	Under assessment <sup>c</sup>	Offsite	NA
Solid	835 <sup>p</sup>	Offsite	NA	Hazardous waste storage facility	Under assessment <sup>c</sup>	Offsite	NA
<b>Nonhazardous (Sanitary)</b>							
Liquid	50,800	Percolation ponds	NA	NA	NA	NA	NA
<b>Nonhazardous (Other)</b>							
Liquid	Included in sanitary	Recycle	NA	NA	NA	NA	NA
Solid	62,000	Segregate and recycle	NA	NA	NA	Industrial and asbestos waste landfills	1,830,000 to 3,060,000 <sup>q</sup>

<sup>a</sup> Spent nuclear fuel is normally expressed in metric tons, not cubic meters.

<sup>b</sup> 1993 data.

<sup>c</sup> Capacity will be increased to accommodate ROD from the DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement, as amended.

<sup>d</sup> Current capacity includes ICPP, TAN, ANL-W, NRF, PBF, and TRA.

<sup>e</sup> New waste calcining facility.

<sup>f</sup> ICPP tank farm.

<sup>g</sup> Solid HLW produced by calcination of liquid HLW.

<sup>h</sup> ICPP debris treatment, HEPA filter leach.

<sup>i</sup> ICPP calcine bin sets.

<sup>j</sup> ICPP new waste calcining facility, debris treatment, HEPA filter leach.

<sup>k</sup> ANL-W, ICPP, RWMC.

<sup>l</sup> Liquid effluent treatment facility, potable water treatment, new waste calcining facility.

<sup>m</sup> ICPP debris treatment, HEPA filter leach, waste experimental reduction facility, lead treatment sodium processing facility, TAN cask dismantlement.

<sup>n</sup> 37,000 m<sup>3</sup> available as of 1991. Additional 67,000 m<sup>3</sup> expansion capacity potentially available.

<sup>o</sup> ANL-W, ICPP, PBF, RWMC, TAN.

<sup>p</sup> 760 m<sup>3</sup> recyclable.

<sup>q</sup> Remaining capacity.

Note: NA= not applicable; WERF= Waste Experimental Reduction Facility.

Source: 60 FR 28680; 61 FR 9441; DOE 1995i; IN DOE 1995d; INEL 1993a.5.

**Transuranic Waste.** Transuranic wastes are stored at the RWMC. This inventory represents more than half of the total DOE inventory. There is very little TRU waste generation at INEL. Most of the TRU waste in storage was received from RFETS. As a result of the ROD from the *Department of Energy Programmatic Spent Nuclear Fuel and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS-0203-F), and pending the ROD to be issued from the *DOE Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive Hazardous Waste* (DOE/EIS-0200-D) and in compliance with the *INEL Site Treatment Plan*, INEL may receive TRU waste from other facilities for treatment. After treatment, the waste would be returned to the generator for storage and eventual transport to a Federal repository. TRU wastes are currently being stored pending approval of WIPP as a repository for these wastes. Assuming WIPP is determined to be a suitable repository for these wastes, pursuant to the requirements of 40 CFR 191 and 40 CFR 268, these wastes will be treated to meet the WIPP WAC and packaged in accordance with DOE and DOT requirements for transport to WIPP for disposal depending on decisions made in the ROD associated with the supplemental EIS being prepared for the proposed continued phased development of WIPP for disposal of TRU waste.

Before 1970, when the AEC first required segregation of TRU wastes from other wastes, TRU wastes were buried in earthen trenches at the RWMC. This waste must be retrieved and repackaged to meet the current WIPP WAC. Wastes generated or received from offsite since 1970 are stored in a form designed for eventual retrieval. Since 1972, TRU wastes have been stored on Pad A in the RWMC. Most of this waste will require certification and repackaging. A new facility, the Advanced Mixed Waste Treatment Project, is being designed to accomplish this task. Some waste has radioactivity levels high enough that there are no certified or licensed transportation capabilities for it. Further study will be required for its eventual disposal. While the EPA has issued a notice of noncompliance for TRU waste stored at the RWMC, a proposed plan for the treatment and storage of TRU wastes has been documented in the Federal Facility Agreement and Consent Order, which addresses EPA and State of Idaho concerns, while also meeting DOE's concerns for worker protection. Some of the waste now handled as TRU or mixed TRU is alpha-contaminated LLW and mixed LLW. A strategy for treatment and disposal of this waste has yet to be established. Onsite and offsite treatment is being investigated.

**Low-Level Waste.** The bulk of LLW generated at INEL is the result of work in contaminated areas and consists of materials such as rags, bags, scrap metal, and used protective clothing. A large volume of LLW is generated in the D&D activities associated with environmental restoration. In addition, small amounts of LLW may be received from offsite for treatment and disposal. These materials must be treated by the operating facility to meet the WAC of the receiving facility, and conformity to these criteria must be verified by the receiving facility. Solid LLW at INEL is sent to the Waste Experimental Reduction Facility for compaction, sizing, incineration, and stabilization before shipment for disposal at the RWMC. The Waste Experimental Reduction Facility will be used to incinerate LLW. It is undergoing modifications to processes and procedures and is expected to be in operation in mid-1996.

**Mixed Low-Level Waste.** The volume of mixed LLW generated at INEL is small. Mixed LLW is stored in several areas onsite awaiting treatment capacities to be developed to treat the specific nature of a wide variety of different mixed waste streams. As a result of the ROD (60 FR 28680) from the *DOE Programmatic Spent Nuclear Fuel and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final EIS* (DOE/EIS-0203-F), pending the ROD from the *DOE Waste Management Programmatic Environmental Impact Statement for the Managing Treatment, Storage, and Disposal of Radioactive Hazardous Waste* (DOE/EIS-0200-D), and in compliance with the consent order resulting from the *INEL Site Treatment Plan*, INEL may accept offsite mixed LLW for treatment. Waste residuals would be returned to the generator or shipped elsewhere for disposal. Mixed LLW is planned to be processed to RCRA Land Disposal Restriction (LDR) treatment standards through the Waste Experimental Reduction Facility incinerator beginning in June 1996, in the Advanced Mixed Waste Treatment Project beginning June 1998 through June 2000, and in the Sodium Processing Facility in March 1997. The use of commercial treatment facilities is also being considered. Large volumes of wastewater are processed in the Process Equipment Waste Evaporator, resulting in a

concentrated mixed waste that is sent to the HLW tank farm and eventually stabilized in a fluidized bed calciner. Condensate from the Process Equipment Waste Evaporator is converted into a concentrated acidic solution in the Liquid ETF. This concentrate is either recycled as a scrubber solution for the calciner or sent to the HLW tank farm for storage. The Liquid ETF eliminates residual discharge of hazardous and radioactive contaminants into wastewater percolation ponds, which was the former practice, in accordance with a consent order signed on October 7, 1992. Current mixed waste plans are documented in the *INEL Site Treatment Plan*, which was prepared in compliance with the *Federal Facility Compliance Act* of 1992.

**Hazardous Waste.** Hazardous wastes are generated at separate facilities at INEL and are staged for shipment offsite to commercial RCRA-permitted treatment and disposal facilities. Offsite shipments are surveyed to determine that the wastes have no radioactive content (are not mixed waste). The major onsite RCRA-permitted hazardous waste storage facility is located in the CFA. The Waste Handling Facility Project at ANL-W will be implemented to handle ANL-W waste. A recycling program has been established, and in 1992, 760 m<sup>3</sup> (994 yd<sup>3</sup>) of hazardous wastes were recycled.

**Nonhazardous Waste.** Nonhazardous waste generated at INEL facilities is disposed of onsite in a landfill complex in the CFA and at the Bonneville County landfill. The onsite landfill complex contains separate areas for sanitary, industrial, and asbestos waste. Sewage is directed to surface impoundments in accordance with terms of the October 7, 1992, consent order, and the water is allowed to evaporate. The resulting sludge is placed in the landfill. Solids are separated and reclaimed where possible. The goal of the INEL waste minimization program is to reduce the nonhazardous waste quantities generated by 50 percent over the next 5 years. The landfill area at INEL is 4.8 ha (12 acres) and is being expanded by 91 ha (225 acres) to provide capacity for at least the next 30 years (60 FR 28680).